



02 July 2020

Terry Sargent
Director External Services
Shire of Esperance
Windich Street
Esperance WA 6450

Our ref: 12531105-9222-5
Your ref:

Dear Terry

Shire of Esperance New Landfill Site Study; Determination of Appropriate Site Selection Criteria

1 Introduction

GHD understands that the Shire of Esperance (the Shire) is seeking a future landfill site for the Shire to accommodate a new modern waste management facility. A site selection study is required to identify a site suitable for development of a landfill, including associated infrastructure.

2 Background

The Shire currently has an active and licensed waste facility at Wylie Bay (Wylie Bay Waste Management Facility). The landfill at Wylie Bay is nearing its final design capacity with an estimate of around two more years of remaining airspace. Further to this, the site licence is currently set to expire in August 2025 with landfilling operations to cease by 31 December 2022. GHD understands that the Shire is yet to discuss options with the Department of Water and Environmental Regulation (DWER) with regards to expanding/ extending the lifespan of the landfilling operation at the Wylie Bay facility further than 2022.

As a result of this, the Shire has been working on developing a new landfill site. In 2012, the Shire commissioned Talis Consultants to undertake a site selection study initially focusing on Crown land and Shire owned land. However, due to the associated Native Title implications with this land tenure, the Shire requested that Talis instead focus on freehold land. The outcome of this site identification survey is provided in the Talis report: *Site Selection Study – Freehold Land Assessment; Technical Report (May, 2016)*. Some additional nominated sites, from outside of the previous area of interest, were also tested through the previously determined site selection criteria and provided in the Talis report: *Freehold Site Selection Study; Additional Nominated Sites Review (June 2016)*. Initially, a study area radius of 60 km surrounding the Esperance town site was investigated. Sites previously selected, assessed and dismissed to date by the Shire has included sites in Dalyup, Scaddan and Merivale.

2.1.1 Current project status

Following completion of landfill capability assessments at the Dalyup, Scaddan and Merivale sites, site constraints and/or to community pressure ultimately led Council to abandon these proposed sites.

In March 2020, Council resolved to undertake a new search for a site north of Speddingup Road East and within the Shire of Esperance boundary. GHD was appointed by the Shire in late May 2020, to facilitate this new landfill site search.

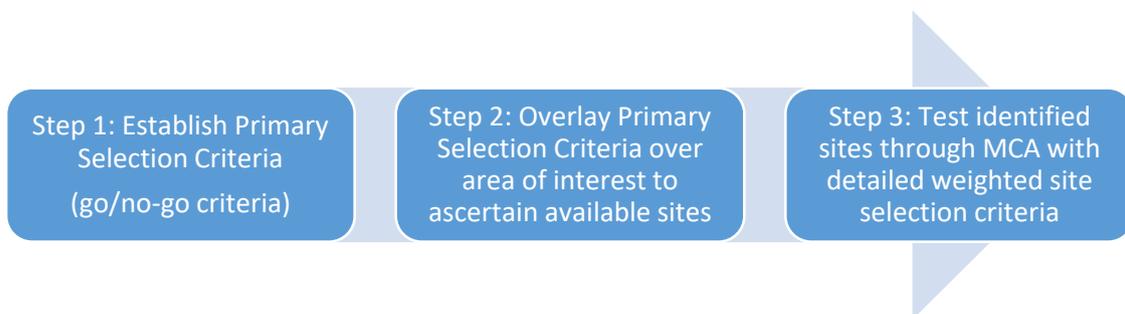
3 Purpose of letter

This preliminary advice letter presents an overview of the key site selection criteria considered relevant for the development of a new modern Waste Management Facility within the Shire of Esperance. The purpose of the letter is to provide a basis for discussion with the Shire to ensure that the key site selection criteria are established and align with the Shire's requirements and preferences.

Pending the outcome of initial discussions with the Shire, this preliminary advice letter can be formalised and endorsed by the Council prior to being utilised within Step 2 of the site selection process.

4 Overview of the Site Selection Process

The steps required to determine available sites that meet the desired criteria are outlined below. The process is an iterative and consultative one.



5 Proposed area of interest for the new landfill site

GHD has been directed to limit the search to the area north of Speddingup Road East but within the Shire of Esperance boundary. GHD understands that Council has not requested for sites within regions to the west or east to be included in the search area to be investigated at this stage. As such, GHD has suggested that the search area be defined by Coolgardie-Esperance Highway (to the west) and Dempster Road (to the east). This aligns with the western and eastern extent of Speddingup Road East.

Further to this, following geographic information system (GIS) spatial mapping using the derived and agreed selection criteria (Step 2), GHD has been requested to specifically test a site at Lot 39 Logan Road, Grass Patch, in addition to other preferred sites to be evaluated through a multi-criteria analysis (MCA) process.

6 Overall Site Selection Criteria

A GIS-based site search is intended to identify candidate sites. Each site is proposed to be assessed against criteria from the following categories:

- Land tenure and ownership
- Logistics and economics
- Operational and engineering
- Environmental and planning
- Social/community

The key questions to be addressed for each site, as presented below, have been developed from relevant Qld, NSW and Vic landfill siting, design and management guidelines and in recognition of the Esperance setting and specific Shire objectives. GHD's proposed response to each of the key questions has been provided in *blue italics* and follows a preliminary discussions with the Shire on the 12 June and 30 June 2020. Selection criteria have been developed from these questions and answers as presented in Section 7 (go/no-go criteria) and Section 9 (detailed MCA criteria).

6.1 Land Tenure and Ownership

Preference for the land tenure to be:

Shire indicated that Crown land and freehold land should be considered. GHD notes that freehold land has the advantage of Native Title having already been extinguished.

Cost of land purchase:

Shire advised that cost of land is not an initial determining selection criteria.

Ownership model:

Shire has not advised GHD of a preference to the ownership model of the land (i.e. purchase, lease, vesting, etc).

6.2 Logistical and economic considerations

Is this an efficient site relative to the waste management catchment?

The search area stipulated by Shire as north of Speddingup Road East is (around 55 km) north of the township and within the Esperance Shire boundary. The Logan Road, Grass Patch site is around 90 km+ from the Esperance township by road.

GHD has suggested that the search area could be further contained by Coolgardie-Esperance Highway (to the west) and Dempster Road (to the east). This aligns with the western and eastern extent of Speddingup Road East.

Can the standard and capacity of the road network accommodate traffic likely to be generated by the proposal?

Preferably within 10 km of an arterial road and preferably highway standard (sealed preferred).

Preference for no winding or steep road access, manageable floodways on roads, suitable bridge capacity, no single lane areas.

6.3 Operational

Does the site provide sufficient land area for present and future requirements?

In discussion with the Shire, the minimum land area should be set at 100 ha within the search criteria allowing for expansion and shallow initial construction.

Will this location meet the requirements of any relevant waste management strategies or policies?

Shire to advice of any current broader waste management strategies / policies to comply with. Preference is for the site to fit within these strategies and policies (if they exist).

Can truck traffic avoid residential areas?

Preferably sites should be able to be accessed through farming areas, and not directly past residences. However, the expected truck movements for the facility are likely to be very low based on current throughputs.

If inadequacies exist, can the road network or traffic management be changed to minimise any impacts, particularly on residential areas?

Sites that have access issues will not be preferred.

Proximity to existing services?

Sites should preferably have an existing/ or availability for connection to the electricity grid. Sites should also preferably have access to potable water and telecommunications services. If there is no power connection available, sites can consider solar and diesel generator options. If there is no potable water available, then tank water can be used (and trucked in if necessary). Communications are important and the site will need either reliable mobile coverage or access to landline.

6.4 Engineering

Are there environmental risks associated with the underlying strata e.g. highly permeable soils or substrata; highly permeable seams or structural faults, significant seismic, subsidence or landslip risk; karst area or other structural instability? Evaluate the underlying geological strata for its suitability for development as an engineered landfill.

Non-karst areas, non-granite.

Are the extractive materials on the site suitable for cover material?

Presence of clay soils in area is preferable.

Deep (rather than shallow) rock formations are also preferred.

Are the soils on the site suitable for use in the construction of dams and drainage systems?

As above.

Are the soils highly erodible? Identify any potential sediment management problems.

Non erodible soil types. Site slopes less than 5%.

6.5 Environmental and Planning aspects

Are there existing soils problems e.g. contaminated soils, acid sulfate or saline soils?

Poor quality or low productivity farm land preferred. Brownfield sites may also be considered. Dried salt pans, or areas of high salinity may be unproductive from a farming perspective and may provide a suitable option for the landfill siting, subject to environmental constraints and other siting assessments.

Are there risks of surface water pollution because of the proximity or pathways to watercourses and wetlands, in particular waterbodies used for drinking water or aquaculture?

Site must be located away from drinking water catchment/ source areas, groundwater recharge areas and proclaimed areas.

Site must avoid significant surface water bodies, RAMSAR wetlands, which includes Lake Warden.

Site must avoid these areas and preference will be given to sites that are not located within the catchment to the wetlands.

Are there risks to groundwater because of shallow or rising groundwater, or because of the proximity to groundwater recharge areas or to areas classified as having a high vulnerability to pollution?

The WA DWER has not yet published landfill design guidelines. The Victorian EPA's Best practice environmental management - publication 788 Siting, design, operation and rehabilitation of landfills (Vic BPEM) refers to a minimum separation distance of 2 metres from the base of the infrastructure to groundwater. GHD notes that final design criteria will require a minimum of 3 m separation from groundwater to the base of the liner (more is preferable). Sites should avoid sensitive groundwater areas, and will likely require a minimum separation distance of >10 m to groundwater from current ground surface to ensure design, construction and environmental compliance objectives can be met.

Is the site subject to flooding (1 in 100 year event)?

Avoid 1 in 100 year flood areas.

Can any separation requirements from waterbodies (under any relevant legislation or guidelines) be complied with?

A minimum of 100 m from a waterbody (Vic BPEM) is likely required; a greater separation distance of more than 250 m is preferred. Dried salt lakes may be treated differently to permanent waterbodies. Dried salt lakes may be annual lakes (where they are inundated seasonally) can have ecological value, however have been found to have decreasing level of ecological diversity and value with increasing salinity. Dried salt lakes may be considered on a case-by-case basis under the definition of a 'waterbody' due to their prevalence in the area, potential tourism value and certain ecological connections.

Is the site outside of a National Park?

The site must be outside of all national parks.

Can clearing of natural vegetation be avoided?

Previously cleared land preferred.

Can clearing of vegetation of high significance be avoided e.g. vegetation used for visual screening, riparian vegetation, vegetation used as corridors for the movement of fauna?

As above.

Are threatened flora or fauna species, populations and ecological communities or their habitats likely to be affected?

Areas of threatened flora, fauna and ecological communities are to be avoided.

Is the site in the proximity of an airport?

Vic BPEM suggests a minimum of 3 km from an airport with jet engine planes, ICAO suggests an exclusion area of 8km. The Shire's preference is to maintain a minimum of an 8km buffer to airports.

Is the site going to potentially impact on future mineral/ resources recovery?

The site should preferably be outside of known mineral or key resource deposits to ensure that the deposits are not sterilised.

6.6 Social/ Community aspects

Is the proposal likely to be compatible with surrounding existing or proposed land uses, particularly residential zones and any special land uses such as hospitals, schools or airports?

Town sites and urban areas to be avoided. Sites more than 500 m from a resident in a rural setting.

Is the proposal likely to pose health risks, including from air or water pollution or through contamination of produce from surrounding agricultural land?

If freehold land, poor quality agricultural land not suitable for cropping to be preferred.

The site sitting will comply with all separation/buffer requirements (under any relevant legislation or guidelines) and will be design to meet best practice guidelines to minimise the potential for offsite impacts

Is the proposal likely to affect the heritage significance of any Aboriginal or non-Aboriginal heritage items found or likely to be found on the site?

Sites with low likelihood of heritage items or significance to be selected (based on desktop review of registered sites initially).

Is there likely to be a problem in meeting sustained compliance with odour, noise, water quality or health requirements?

Sites to be more than 1 km from nearest residential area, 500 m from a single farm house.

Is the site highly visible? Will there be significant visual impacts?

Ideally precluded from view by passing traffic by natural features such as hills. This is not considered a significant criteria in the context of the area of interest. Further to this, screening through trees etc can be established post construction to soften any amenity impacts.

Is the proposal at this site likely to contribute to any existing cumulative problems?

No – the site will be a newly established facility

Are the rainfall patterns or prevailing wind directions likely to cause management difficulties, taking into consideration leachate generation and odour dispersal?

Not upwind of residential areas within a buffer of 500 m.

Are the local climatic conditions (e.g. air movement, rainfall) in combination with the topography likely to result in microclimatic conditions which will adversely increase impacts on the community (consider land slope, wind strength and directions, and potential for katabatic drift)?

Preferably not in areas subject to thermal inversions; creek valleys/water courses that can exacerbate odour impacts down gradient under inversion conditions.

7 STEP 1 - Selection of primary criteria (unweighted)

For the purposes of selecting several preferred candidate sites to test through the MCA process, GHD proposes key pass/fail primary selection criteria (unweighted) that can be geospatially mapped and comprise go/no-go aspects. If no sites are found to meet all of these initial criteria then GHD will work with the Shire to revise criteria as appropriate to broaden the search and increase the number of candidate sites for further assessment.

Following a discussion with the Shire on the 12 June 2020, GHD has prepared the primary selection criteria (go/no-go) to enable a filter of areas (Step 2) that can proceed through to Step 3 (MCA process).

Table 1 Development of primary criteria (go/no-go aspects)

Criteria Category	Criteria	Requirement
Area of interest	Southern extent	Speddingup Road East
	Northern extent	Within the Esperance Shire boundary
	Western extent	Coolgardie-Esperance Highway
	Eastern extent	Dempster Road
Land tenure and ownership	Tenure	Freehold and Crown land
Logistical and economics	Size	Minimum of 100 ha
Environmental/planning	National Parks	Outside of National Parks
	Wetlands	Outside of RAMSAR wetlands (including Lake Warden)

Criteria Category	Criteria	Requirement
	Planning	Not in town sites or urban setting
	Proximity to airports	Minimum of 8km from an airport
	Flooding	Avoid flood prone areas as mapped
	Proximity to wetlands/ surface water bodies	Minimum of 250 m
	Vegetation cover	Previously cleared including degraded farmland and existing brownfield sites (old mine etc). Remnant vegetation to be avoided
	Threatened or priority flora, fauna or ecological communities	No threatened or priority flora, fauna or ecological communities on site ¹
	Drinking water protection areas	Outside of drinking water catchment areas, groundwater recharge areas and proclaimed water management areas
Social/community	Distance from residents (rural setting)	Minimum of 500 m from a resident (in a rural setting)
	Aboriginal and European heritage values	No registered Aboriginal or European Heritage sites

8 STEP 2 - Geospatial mapping

Once primary criteria outlined in Table 1 are agreed with the Shire, these criteria will be overlaid spatially to identify areas that can be considered further within the MCA process (refer to Section 9).

9 STEP 3 - Multi Criteria Analysis (weighted)

Sites identified through STEP 2 of the process are proposed to be further tested through a MCA.

9.1 Weighted value allocation

Starting with a perfect score of 10, the relative importance of a particular comparison criteria will be assessed relative to another criteria to determine its relative importance within the grouping. A maximum weighting of 10 is to be given to the criteria considered most important, with lesser amounts allocated for other criteria.

¹ This search costs \$330 per aspect per site, therefore to cover the area of interest it will cost around \$990 ex GST

9.2 Evaluation process

Each criteria will be assessed based on the following scoring system, and a numeric score assigned:

- 0 = Does not meet criteria (no-go)
- 1 = Least meets the criteria/ weakly consistent
- 2 = Partially meets the criteria/ moderately consistent
- 3 = Substantially meets the criteria/ largely consistent
- 4 = Best meets criteria/ fully consistent

9.3 Weighted score

The numeric score assigned in the evaluation process above is then multiplied by the criteria weighting to yield a weighted score for a site against the criterion. The resulting weighted scores are then added for each site to derive a total weighted score for comparison to other sites.

9.4 Proposed weightings

The simplified criteria in each category, and the weightings proposed by GHD (for review by the Shire) are shown in Table 2. During the MCA assessment process, each site will be tested against the overall selection criteria outlined in Section 6 and Table 1 with a score in relation to the specific weighted criterion made. The scoring process, whilst relatively subjective, will be supported with detailed rationale in the final report.

Table 2 Evaluation criteria and weightings

Criteria (with reference to Section 6)	Weighting assigned
LAND TENURE AND OWNERSHIP	
Availability of land	10
Ownership model of land	7
Sub-total	17
LOGISTICS AND ECONOMICS	
Distance of site to (waste collection) catchment area	6
Capacity and standard of the road network	9
Distance from arterial road	9
Land cost	8
Minimise overall project costs	9
Sub-total	41

Criteria (with reference to Section 6)	Weighting assigned
OPERATIONAL AND ENGINEERING	
Provide required landfill capacity	8
Ease of construction	6
Provide stable structure (i.e. conducive geology and topography)	10
Enable staging of landfill	7
Maximise operational life	9
Proximity to services	8
Sub-total	48
ENVIRONMENTAL AND PLANNING	
Minimise vegetation loss	7
Minimise impact on flora and fauna	8
Minimise construction impacts	6
Minimise impact on waterways and wetlands	10
Minimise impact on groundwater	10
Conducive to ongoing current and surrounding landuse	8
Avoids future mineral and resource deposit sterilisation	7
Sub-total	56
SOCIAL/COMMUNITY	
Minimise visual impact	6
Satisfies required residential buffer distances	10
Avoid areas of significant heritage value	10
Land of low alternate land use value	8
Sub-total	34

10 Concluding comments

With the Shire's endorsement of the proposed Go/No-go primary selection criteria in STEP 1 (Section 7), GHD can commence the geospatial mapping within STEP 2, noting that we have not yet been commissioned by the Shire to proceed beyond development of site selection criteria.

GHD also seeks the Shire's review and endorsement of the proposed weightings allocated to the key selection criteria as presented in Section 9 and Table 2.

Once the selection criteria have been agreed, we will formalise the advice contained in this preliminary advice letter (as-amended if necessary).

Sincerely
GHD



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